

# Integrated Supportability Analysis and Cost System Enhanced

In recent years, the NASA Glenn Research Center at Lewis Field had recognized the need for propulsion system designs that would not only enhance performance but improve reliability and reduce system life-cycle costs. To deal with these issues, Glenn, in cooperation with GE Aircraft Engines, created the Enhanced Integrated Supportability Analysis and Cost System (ISACS+).

GE developed the ISACS computer code in the early 1990's to simulate operation and support for the U.S. Air Force F-16 engine program. In 1996, Glenn's Propulsion Systems Analysis Office (PSAO) obtained the software from GE and entered into a 3-year Space Act Agreement whereby GE provided consulting support and Glenn's PSAO directed and coordinated the enhancement of the software. Glenn contracted with Technology Support Corporation of Cary, North Carolina, to perform this task. Funding for the enhanced ISACS (ISACS+) was provided by NASA Headquarters' Office of Safety & Mission Assurance and Office of Aero-Space Technology through Glenn's Office of Safety and Assurance Technologies and PSAO, respectively.

ISACS+, operating in the MS Windows NT/95 environment, enables analysts to model a fleet of military or commercial aircraft and engines to determine the effects of engine reliability, maintainability, and logistics support on system safety and life-cycle cost. The ISACS+ model will support trade studies during the various design phases and through the full-scale production and fielding of aircraft to help designers and engineers meet the specified mission requirements at a minimum life-cycle cost. For aircraft engines in the field, ISACS+ can help maintenance planners specify the most economical maintenance support infrastructure. This would include providing information on when to repair, buy, and store individual parts and forecasting such things as labor utilization, support equipment, and demand for consumables at each maintenance center for a fleet of aircraft.

In addition, ISACS+ can be used to manage risk by tracking and monitoring propulsion system and component usage. This usage history is used to schedule repairs to reduce risk and maintenance costs and to formulate warranty plans by identifying high-risk areas and predicting failure rates and repair intervals.

ISACS+ will enhance Glenn's capability to analyze the effects of various propulsion technologies on the reliability, maintainability, and life-cycle cost of advanced propulsion systems as they are applied to future fleets of aircraft. Outside NASA, military planners, engine and airframe manufacturers, and commercial airlines could use ISACS+ for trade studies, planning, and cost estimating activities. The code could be modified to model space, ground, and sea transportation systems as well as any product requiring periodic maintenance.

The ISACS+ program software was completed in July 1999 and is available for anyone to use. The Technology Support Corporation plans to further develop and market the code

and to provide documentation and customer assistance for its users starting in October 1999.

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